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EDUCATION AND TRAINING

1992 Ph.D., Geostatistics, Stanford University
1982 M.Sc., Geology, University of Montana
1980 B.A., Geology, University of Montana

RESEARCH AND PROFESSIONAL EXPERIENCE

1992-Present, **Staff Scientist**, Earth Systems Science Division, Pacific Northwest National Laboratory, Richland, Washington. *Lead investigator for research on the use of geostatistics for environmental mapping and uncertainty analysis, the application of geostatistical techniques to studies of spatial heterogeneity, and the geologic controls on subsurface fluid flow. Geological and statistical research on the impact of riverine and hyporheic processes on salmon spawning.*

1982-1992, **Senior Petroleum Geologist**, Amoco Production Company, Denver, Colorado. *Subsurface mapping of structure and sedimentary geology for petroleum exploration and production. Statistical and geostatistical methods for contouring and classification of subsurface geologic data.*

SELECTED PUBLICATIONS ***(h-index of 11 from 27 publications)***

Freedman VL, X Chen, SA Finsterle, MD Freshley, I Gorton, LJ Gosink, E Keating, C Lansing, WAM Moeglein, CJ Murray, GSH Pau, EA Porter, S Purohit, ML Rockhold, KL Schuchardt, C Sivaramakrishnan, VV Vesselinov, and SR Waichler. 2014. "A high-performance workflow system for subsurface simulation." *Environmental Modelling & Software* 55:176-189. doi:10.1016/j.envsoft.2014.01.030

Murray CJ, JM Zachara, JP McKinley, AL Ward, YJ Bott, KE Draper, and DA Moore. 2013. "Establishing a geochemical heterogeneity model for a contaminated vadose zone – aquifer system." *Journal of Contaminant Hydrology* 153: 122-140.

Chen X., Hammond G. E., Murray C., Rockhold M., Vermeul V. R., and Zachara J. M. (2013) Applications of ensemble-based data assimilation techniques for aquifer characterization using tracer data at Hanford 300 Area. *Water Resources Research* 49(10):7064-7066.

Stegen J. C., Lin X., Fredrickson J. K., Chen X., Kennedy D. W., Murray C., Rockhold M., and Konopka A. (2013) Quantifying community assembly processes and identifying features that impose them. *ISME Journal* 7(11):2069-2079. doi:10.1038/ismej.2013.93.

Klett KJ, C Torgersen, J Henning, and CJ Murray. 2013. "Spatial consistency of Chinook salmon redd distribution within and among years in the Cowlitz River, Washington." *North American Journal of Fisheries Management* 33(3):508-518. doi:10.1080/02755947.2013.778924

Kowalsky MB, SA Finsterle, KH Williams, CJ Murray, M Commer, DR Newcomer, AL Englert, CI Steefel, and S Hubbard. 2012. "On parameterization of the inverse problem for estimating aquifer properties using tracer data." *Water Resources Research* 48:Article No. W06535. doi:10.1029/2011WR011203.

Hou Z, ML Rockhold, and CJ Murray. 2012. "Evaluating the impacts of caprock and reservoir properties on potential risk of CO2 leakage after injection." *Environmental Earth Sciences* 66(8):2403-2415. doi: 10.1007/s12665-011-1465-2.

Yabusaki SB, Y Fang, KH Williams, CJ Murray, AL Ward, R Dayvault, SR Waichler, DR Newcomer, FA Spane, and PE Long. 2011. "Variably Saturated Flow and Multicomponent Biogeochemical Reactive Transport Modeling of a Uranium Bioremediation Field Experiment." *Journal of Contaminant Hydrology* 126(3-4):271-290.

Geist D.R., C.J. Murray, T.P. Hanrahan, and Y.L. Xie. 2008. "A model of the effects of flow fluctuations on fall Chinook salmon spawning habitat availability in the Columbia River." *North American Journal of Fisheries Management* 28:1911-1927. doi:10.1577/M07-074.

Geist, D.R., E.V. Arntzen, C.J. Murray, K.E. McGrath, Y.J. Bott, and T.P. Hanrahan. 2008. "Influence of river level on temperature and hydraulic gradients in chum and fall Chinook salmon spawning areas downstream of Bonneville Dam, Columbia River." *North American Journal of Fisheries Management* 27: 30-41.

Murray, C.J., A.L. Ward, and J. L. Wilson. 2007. "Influence of clastic dikes on vertical migration of contaminants at the Hanford Site." *Vadose Zone Journal* 6(4): 959-970.

Murray, C.J. (Member of the Committee). Committee for the Technical Assessment of Environmental Programs at the Los Alamos National Laboratory, National Research Council. 2007. Plans and Practices for Groundwater Protection at the Los Alamos National Laboratory. Committee for the Technical Assessment of Environmental Programs at the Los Alamos National Laboratory, Nuclear and Radiation Studies Board, Division of Earth and Life Studies. National Research Council of The National Academies, The National Academies Press, Washington, D.C.

Clement, W.P., and C.J. Murray. 2007. "GPR data acquired to image clastic dikes at the Hanford Site, Hanford, Washington." In *Stratigraphic Analyses using GPR*, Special Publication 432, p. 169-181, Baker, G. S., and H. Jol, eds., Geological Society of America, Special Publication Series, Boulder, Colorado.

Last, G.V., C. J. Murray, D. A. Bush, E. C. Sullivan, M. L. Rockhold, R. D. Mackley, and B. N. Bjornstad. 2007. "Standardization of Borehole Data to Support Vadose Zone Flow and Transport Modeling." *Vadose Zone Journal* 6(4): 906-912.

Scheibe, T.D., Y. Fang, C.J. Murray, E.E. Roden, J. Chen, Y.-J. Chien, S.C. Brooks, and S.S. Hubbard. 2006. "Transport and biogeochemical reaction of metals in a physically and chemically heterogeneous aquifer." *Geosphere* 2(4): 220-235.

Scheibe, T. D., and C. J. Murray. 1998. "A comparison of stochastic simulation techniques for groundwater transport modeling." In: G. S. Fraser and J. M. Davis (eds.), *Uses of Sedimentologic and Stratigraphic Information in Predicting Reservoir Heterogeneity*, Special Publication of the SEPM (Society for Sedimentary Geology), p. 107-118.

SYNERGISTIC ACTIVITIES

- Registered Professional Geologist, State of Washington (No. 1393), Barrow Fellowship in the Earth Sciences (1988-1992), Blaustein Fellowship in the Earth Sciences (1988-1992), National Science Foundation Graduate Fellowship (1980-1982), and Sigma Xi Research Award (1980)
- Adjunct faculty, University of Montana and Washington State University Tri-Cities (1997-present)
- Member of NAS/NRC panel evaluating groundwater contamination at Los Alamos National Laboratory (2006-2007)
- Editorial Board, GEOLOGY, 1998-2000
- Co-Coordinator for DOE's Subsurface Science, Bacterial Transport Subprogram, 1994-1997